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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,751	02/09/2002	Arjun Kar Roy	01CON211P	4492
25700	7590	07/14/2004	EXAMINER	
FARJAMI & FARJAMI LLP 26522 LA ALAMEDA AVENUE, SUITE 360 MISSION VIEJO, CA 92691			CHU, CHRIS C	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/073,751

Applicant(s)

KARROY ET AL.

Examiner

Chris C. Chu

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 - 5, 7 - 13, 15 - 18 and 28 - 31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 5, 7 - 13, 15 - 18 and 28 - 31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Response to Amendment***

1. Applicant's amendment filed on September 22, 2003 has been received and entered in the case.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

One skilled in the art would not be reasonably apprised of how to make the invention, since the negative limitation "said metal resistor not being connected to said first interconnect metal layer" does not have basis in the original specification, i.e. there is no explicit teaching to this effect. This is a new matter rejection.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 7, 10, 15, 28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Pat. No. 6,117,789) in view of Geller et al. (U. S. Pat. No. 5,929,510).

Regarding claims 1 and 10, Lee discloses in e.g., Fig. 1E an integrated circuit chip comprising:

- a first intermetallic dielectric layer (102) situated over a substrate (100);
- a metal resistor (104a) situated over said first intermetallic dielectric layer, said metal resistor not being connected to said first interconnect metal layer;
- a dielectric cap layer (106b) patterned on said metal resistor;
- a second intermetallic dielectric layer (108a) formed over said dielectric cap layer and metal resistor;
- a second interconnect metal layer (118a and 118b) over said second intermetallic dielectric layer;
- a first intermediate via (112d) connected to a first terminal of said metal resistor, said first intermediate via being further connected to a first metal segment patterned in said second interconnect metal layer;

- a second intermediate via (112c) connected to a second terminal of a metal resistor, the second intermediate via being further connected to a second metal segment patterned in said second interconnect metal layer.

However, Lee does not disclose a first interconnect metal layer. Geller et al. teaches in e.g., Fig. 1 and column 2, line 67 – column 3, line 2 a first interconnect metal layer (22) under a first intermetallic dielectric layer (30) and a resistor (46). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Lee by adding the first interconnect metal layer under the first intermetallic dielectric layer and the resistor as taught by Geller et al. The ordinary artisan would have been motivated to modify Lee in the manner described above for at least the purpose of providing an RF filter or center conductor (column 3, lines 5 - 7).

Regarding claims 7 and 15, Lee discloses in e.g., Fig. 1E and column 3, line 11 the dielectric cap layer (106b) comprising silicon nitride.

Regarding claims 28 and 30, Lee discloses in e.g., Fig. 1E said metal resistor being not connected from below.

6. Claims 2 – 5, 8, 9, 11 – 13 and 16 – 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee and Geller et al. as applied to claims 1 and 10 above, and further in view of Zhao et al. (U. S. Pat. No. 6, 627, 539).

Lee discloses the claimed invention except for the material of the metal resistor to be tantalum nitride (claims 2 and 11); the material of the first interconnect metal layer comprising aluminum (claims 3 and 16); the material of the first intermetallic dielectric layer comprising

Art Unit: 2815

HDPCVD silicon dioxide (claims 4 and 12); the material of the second intermetallic dielectric layer comprising undoped silica glass (claims 5 and 13); an oxide cap layer (claims 8 and 17); and the material of the oxide cap layer comprising PECVD silicon dioxide (claims 9 and 18).

Zhao et al. teaches in e.g., Fig. 2L the material of a metal resistor (220, at the left-side) to be tantalum nitride (column 6, lines 27 ~ 32); the material of a first interconnect metal layer (204) comprising aluminum (column 4, lines 12 ~ 17); the material of a first intermetallic dielectric layer (205) comprising HDPCVD silicon dioxide (column 4, lines 18 ~ 38); the material of a second intermetallic dielectric layer (224) comprising undoped silica glass (column 4, lines 18 ~ 38); an oxide cap layer (222; column 7, lines 17 ~ 20) situating between a metal resistor and a dielectric layer; and the material of the oxide cap layer comprising PECVD silicon dioxide (column 7, lines 17 ~ 20). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to further modify Lee by using the first interconnect metal layer to be tantalum nitride; the material of the first interconnect metal layer comprising aluminum; the material of the first intermetallic dielectric layer comprising HDPCVD silicon dioxide; the material of the second intermetallic dielectric layer comprising undoped silica glass; an oxide cap layer; and the material of the oxide cap layer comprising PECVD silicon dioxide as taught by Geller et al. The ordinary artisan would have been motivated to further modify Lee in the manner described above for at least the purpose of reducing resistivity and noise related to substrate coupling, and allowing an improved process window and simplifying the etching process (column 3, lines 20 - 28).

7. Claims 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee and Geller et al. as applied to claims 1 and 10 above, and further in view of Ishii (U. S. Pat. No. 5, 422, 307).

Lee discloses the claimed invention except for the thickness of the metal resistor. Ishii teaches in e.g., Fig. 14D and column 9, lines 61 – 63 the thickness of a metal resistor (212) being 500 Angstrom. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to further modify Lee by using the thickness of a metal resistor to be 500 Angstrom as taught by Ishii. The ordinary artisan would have been motivated to further modify Lee in the manner described above for at least the purpose of preventing a defective product due to bad connection and improving the yield (column 10, lines 36 - 38).

#### ***Response to Arguments***

8. Applicant's arguments with respect to claims 1 and 10 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

Art Unit: 2815

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37


CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 517-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2815

Chris C. Chu  
Examiner  
Art Unit 2815

c.c.  
7/9/04